

Remarks

Examiner Pham is thanked for the thorough Office Action.

Applicant acknowledges the new grounds of rejection.

In the Claims

Independent claims 1, 24 and 46 have each been amended to replace "are bi-layer having" with -- include -- at lines 4 and 5; line 6 and lines 4 and 5, respectively. These amendments do not limit the at least one of the two or more different types of pillar structures as being bi-layer but includes a lower high-melting-point non-solder supporting portion and an upper solder material portion.

These amendments are not believed to narrow the claims.

Also in independent claims 1, 24 and 46, the "high-melting-point non-solder material portion" has been amended to -- high-melting-point non-solder material supporting portion -- throughout.

Dependent claims 16, 38, 61 and 69 to 71 have been amended to correspond to the amendments to their respective independent claims.

The claims have not otherwise been amended.

No new matter has believed to have been added.

Claim Objections

The Objection to Claims 1 and 46

The objection to claim 1: (1) at line 4 in that “in a pattern” should be -- in patterns -- to match with “two or more”; and (2) at line 5 in that “are” should be replaced by -- is -- to match with “at least one”; and to claim 46 at lines 3 and 4 in that “in a pattern” should be -- in patterns -- to match with “two or more” is acknowledged.

Claims 1 and 46 have been amended in a manner to moot this rejection. It is noted that independent claim 24 has also been likewise amended (at line 6).

Applicant’s attorney respectfully disagrees with the Examiner’s other objections to claims 1 and 46 in that “in a pattern” should be -- in patterns -- to match with “two or more” at their respective lines. Multiple, i.e. “two or more different types of pillar structures over the substrate...”, may be in a single pattern. For example,

having one type of pillar structure arranged in rows and columns while a second type of pillar structure arranged in a circle still, in the aggregate, form a (single) pattern just as an elaborately embroidered carpet has an overall pattern even though separate elements of the embroidery could be in different "patterns" taken alone.

Claim Rejections

The Rejection Of Claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46, 47, 54, 56 to 58, 64 and 69 to 71 Under 35 U.S.C. §102(b) As Being Anticipated By Kondoh et al. (U.S. Patent No. 5,448,114)

The rejection of claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46, 47, 54, 56 to 58, 64 and 69 to 71 under 35 U.S.C. §102(b) as anticipated by Kondoh et al. (U.S. Patent No. 5,448,114) (the '114 Kondoh Patent) is acknowledged.

According to the section 2131 of the MPEP "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. vs. Union Oil Co. of California, 814 F. 2d 628, 631 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicants' wish to briefly point up the claimed features of their invention which are believed to be not shown nor obvious from the teachings of known

references in this field. The claims (including independent claims 26 and 46) (using independent claim 1 as a template) all clearly define “[a] die comprising: (1) a substrate; and (2) two or more different types of pillar structures formed over the substrate in a pattern; ~~at least one of the two or more different types of pillar structures are~~ ~~bil-~~ ~~layer having~~ includes a lower high-melting-point non-solder supporting portion and an upper solder material portion over and in substantial contact with only an upper surface of the lower high-melting point non-solder supporting portion; wherein the lower high-melting-point non-solder portion does not melt during a reflow process to form the two or more different types of pillar structures.” (emphasis added)

Thus, at least one of the two or more different types of instantly claimed pillar structures has a “high-melting-point non-solder supporting portion” (pillar portion) and an upper solder portion (solder portion) “over and in substantial contact with only an upper surface of the lower high-melting point non-solder supporting portion...”.

However, in the Kondoh patent both the wall member 3 and the bump 4 are not the "pillar structures" as instantly claimed.

For the bump 4 (Fig. 11 of Kondoh), the asserted 'high-melting-point non-solder supporting material portion 53' is only a barrier layer ("second barrier layer 53" (Col. 14, line 26)). It does not function as a supporting layer as does the claimed

"lower high-melting-point non-solder material supporting portion" in the instant invention. In contrast, the "second supporting layer 54" ["upper solder material portion" of instant claims 1, 24 and 46] in the Kondoh patent is a solder containing 40% by weight of lead and 60% by weight of tin (Column 14, lines 25~33). Further, The Kondoh "second supporting layer 54" is "over and in substantial contact with only an upper surface of "second barrier layer 53" which, Applicant urges, is not the "high-melting-point non-solder supporting portion" as instantly claimed.

Wall member 3 is comprised of a solder only (See column 9, line 10: "a wall member 3 made of solder"). It does not contain the high-melting-point non-solder material supporting portion. Therefore, the claimed invention should be novel under 102(b) over Kondoh as it does not disclose, *inter alia*, "at least one of the two or more different types of pillar structures includes a lower high-melting-point non-solder supporting portion and an upper solder material portion over and in substantial contact with only an upper surface of the lower high-melting point non-solder supporting portion;" (emphasis added) as instantly claimed in independent claims 1, 24 and 46, and thus in depending claims 2, 9, 11 to 13, 19, 31, 33 to 35, 41, 47, 54, 56 to 58, 64 and 69 to 71.

The Rejection Of Claims 3 to 8, 10, 16, 20 to 23, 25 to 30, 32, 38, 42 to 45, 48 to 53, 55, 61 and 65 to 68 Under 35 U.S.C. §103(a) as Being Unpatentable Over Kondoh et al. (U.S. Patent No. 5,448,114) As Applied To Claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46,

47, 54, 56 to 58, 64 and 69 to 71 Above, And Further In View Of Lee et al. (U.S. Patent No. 6,642,136 B1)

The rejection of claims 3 to 8, 10, 16, 20 to 23, 25 to 30, 32, 38, 42 to 45, 48 to 53, 55, 61 and 65 to 68 under 35 U.S.C. §103(a) as being unpatentable over Kondoh et al. (U.S. Patent No. 5,448,114) (the '114 Kondoh Patent) as applied to claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46, 47, 54, 56 to 58, 64 and 69 to 71 above, and further in view of Lee et al. (U.S. Patent No. 6,642,136 B1 (the '136 Lee Patent) and the following reasons is acknowledged.

§103 Rejections – Overview Analysis

According to the MPEP section 2142 regarding §103, "The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness...". Further,

To establish a prima facie case of obviousness, three basis criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure.

However, neither Kondoh alone, nor Kondoh as applied to claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46, 47, 54, 56 to 58, 64 and 69 to 71 and further in view of Lee, disclose or fairly teach, alone or in the combination noted by the Examiner, inter alia, the claimed limitations “at least one of the two or more different types of pillar structures includes a lower high-melting-point non-solder supporting portion and an upper solder material portion over and in substantial contact with only an upper surface of the lower high-melting point non-solder supporting portion,” (emphasis added) in combination with the other claimed limitations. Lee does not cure the deficiencies of Kondoh, for example, as discussed above. Thus claims 3 to 8, 10, 16, 20 to 23, 25 to 30, 32, 38, 42 to 45, 48 to 53, 55, 61 and 65 to 68 are not obvious over Kondoh under §103(a) and claims 3 to 8, 10, 16, 20 to 23, 25 to 30, 32, 38, 42 to 45, 48 to 53, 55, 61 and 65 to 68 are not obvious over Kondoh as applied to claims 1, 2, 9, 11 to 13, 19, 24, 31, 33 to 35, 41, 46, 47, 54, 56 to 58, 64 and 69 to 71 and further in view of Lee under §103(a).

Therefore claims 1 to 13, 16, 19 to 35, 38, 41 to 58, 61 and 64 to 71 are submitted to be allowable over the cited references and reconsideration and allowance are respectfully solicited.

CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectively requested. Allowance of all claims is requested. Issuance of the application is requested.

It is requested that the Examiner telephone Stephen G. Stanton, Esq. (#35,690) at (610) 296 - 5194 or the undersigned attorney at (845) 452 - 5863 if the Examiner has any questions or issues that may be resolved to expedite prosecution and place this Application in condition for Allowance.

Respectively submitted,

A handwritten signature in black ink, appearing to read "SBA", is placed above a solid horizontal line.

Stephen B. Ackerman
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